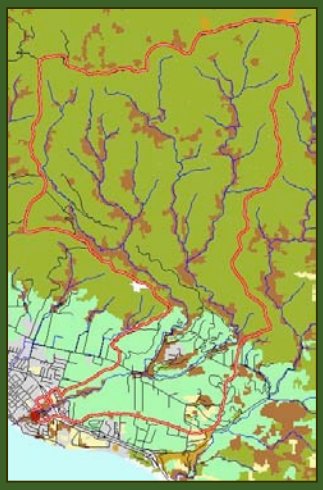
SOUTHERN COASTAL SANTA BARBARA CREEKS BIOASSESSMENT PROGRAM

2011 REPORT



Prepared for:

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Executive Summary

Introduction

This report summarizes the results of the 2011 Southern Coastal Santa Barbara Creeks Bioassessment Program, an effort funded by the City of Santa Barbara and County of Santa Barbara. Ecology Consultants, Inc. (Ecology) prepared the report, and serves as the City's and County's consultant for the Program. This is the 12th year of the Program, which began in 2000. The purpose of the Program is to assess and monitor the biological integrity of creeks in the study area as they respond through time to natural and human influences. The Program involves annual collection and analysis of benthic macroinvertebrate (BMI) samples and other pertinent physiochemical and biological data in study reaches using U.S. Environmental Protection Agency (USEPA) endorsed rapid bioassessment techniques. BMI samples are analyzed in the laboratory to determine BMI abundance, composition, and diversity. Scores and classifications of biotic integrity are determined for study streams using the Index of Biological Integrity (IBI) developed for study area creeks in 2009. The IBI is a system that yields a numeric score and classifies the biological integrity of a stream as Very Poor, Poor, Fair, Good, or Excellent based on the BMI community present in the stream, as determined by completing a bioassessment survey and associated laboratory and analytical work. Seven "core BMI metrics" are calculated and used to determine the IBI score. Each core metric is highly sensitive to human disturbance, and collectively they represent different aspects of the BMI community including diversity, composition, and trophic group representation. By condensing complex biological data into an easily understood score and classification of biological integrity, the IBI serves as an effective tool for the City and County in monitoring the overall condition of local creeks, and taking appropriate watershed management actions.

This year the Program was expanded to include study reaches in the estuaries of three local watersheds. Estuaries are open water bodies where a freshwater stream meets and mixes with saltwater from the ocean, creating brackish water conditions with salinities that change throughout the year depending on varying seasonal inputs from the stream and ocean tides. USEPA endorsed rapid bioassessment techniques for estuaries were used to collect BMI samples and other pertinent physiochemical and biological data. The IBI cannot be used to assess the condition of local estuaries, which have very different physiochemical conditions (e.g., brackish water, substrate, water flow, etc.) and biological assemblages than do freshwater creeks. It is hoped that an IBI or similar tool to assess the condition of local estuaries can be developed at some point, although a substantial data collection and analyses effort would be required over several years.

Study Area

The study area encompasses approximately 60 km of the southern Santa Barbara County coast from the Rincon Creek watershed at the Santa Barbara/Ventura County line west to Gaviota Creek. There are approximately 40 1st to 5th order coastal streams along this stretch of coast, all of which drain the southern face of the Santa Ynez Mountains. 51 different stream study reaches in 20 watersheds have been surveyed on one or more occasions during the springs and summers from 2000 to 2011. 16 stream study reaches were surveyed this year, and 3 estuary study reaches were surveyed.

Methods

Physiochemical and biological data for the study reaches was gathered through a combination of methods including field surveys, laboratory analyses, spatial data analyses using geographic information system software, and review of United States Geological Survey (USGS) 7.5-minute quadrangle maps and recent aerial photographs. For the creek study reaches, the seven IBI core metrics were calculated for and IBI scores and classifications of biological integrity were determined.

Results

This past rainy season (i.e., 2010-2011) had the 2nd highest rainfall total in last 10 years, and corresponding high peak storm flows in local creeks. Impacts from streambed scouring were evident in the BMI community of the study reaches as a whole in the form of low IBI score average and range, low BMI density and high percent Baetidae. Partial recovery in physical habitat conditions and the BMI community occurred at upper Mission Creek study reaches M3 and M4, which were heavily impacted by the Jesusita fire (May 2009). It appears that at least another year will be needed for the BMI communities of these sites to recover to a pre-fire state.

Estuaries were included in the Program for the first time this year. The three estuaries studied (Sycamore Creek, Mission Creek, and Arroyo Burro) are all in a disturbed condition with significant urban development in their watersheds. Although there were differences in density and composition, BMI data from the three sites was similar with respect to overall diversity, and the two most abundant taxa (Chironomids and Amphipods) were ubiquitous at the three sites. The data collected at the study estuaries helps to characterize their ecological condition and functioning, and serves as a baseline from which to evaluate future trends at these sites. It is advisable to study a few "reference" or "best condition available" estuaries next year to determine whether there are significant differences in the BMI community between them and the more disturbed sites, and evaluate whether or not the development of a BMI-based IBI for local estuaries is promising.